

Table of Contents

Credits	iii
Ocean Monitoring Program Staff and Acknowledgements	iv
Executive Summary	1
Chapter 1. General Introduction	5
<i>Introduction</i>	5
<i>Background</i>	5
<i>Receiving Waters Monitoring</i>	6
<i>Literature Cited</i>	7
Chapter 2. Oceanographic Conditions	11
<i>Introduction</i>	11
<i>Materials and Methods</i>	11
<i>Results and Discussion</i>	13
<i>Summary and Conclusions</i>	19
<i>Literature Cited</i>	22
Chapter 3. Microbiology	25
<i>Introduction</i>	25
<i>Materials and Methods</i>	25
<i>Results and Discussion</i>	27
<i>Summary and Conclusions</i>	29
<i>Literature Cited</i>	31
Chapter 4. Sediment Characteristics	33
<i>Introduction</i>	33
<i>Materials and Methods</i>	34
<i>Results and Discussion</i>	35
<i>Summary and Conclusions</i>	42
<i>Literature Cited</i>	43
Chapter 5. Macrobenthic Communities	45
<i>Introduction</i>	45
<i>Materials and Methods</i>	45
<i>Results and Discussion</i>	47
<i>Summary and Conclusions</i>	55
<i>Literature Cited</i>	56

Table of Contents

(continued)

Chapter 6. Demersal Fishes and Megabenthic Invertebrates	61
<i>Introduction</i>	61
<i>Materials and Methods</i>	61
<i>Results and Discussion.....</i>	62
<i>Summary and Conclusions</i>	70
<i>Literature Cited</i>	71
Chapter 7. Bioaccumulation of Contaminants in Fish Tissues	75
<i>Introduction</i>	75
<i>Materials and Methods</i>	75
<i>Results and Discussion</i>	77
<i>Summary and Conclusions</i>	81
<i>Literature Cited</i>	82
Glossary	85
Appendices	
<i>Appendix A: Supporting Data — Oceanographic Conditions</i>	
<i>Appendix B: Supporting Data — Microbiology</i>	
<i>Appendix C: Supporting Data — Sediment Characteristics</i>	
<i>Appendix D: Supporting Data — Macrobenthic Communities</i>	
<i>Appendix E: Supporting Data — Demersal Fishes and Megabenthic Invertebrates</i>	
<i>Appendix F: Supporting Data — Bioaccumulation of Contaminants in Fish Tissues</i>	

How to cite this document: City of San Diego. (2009). Annual Receiving Waters Monitoring Report for the Point Loma Ocean Outfall, 2008. City of San Diego Ocean Monitoring Program, Metropolitan Wastewater Department, Environmental Monitoring and Technical Services Division, San Diego, CA.

Credits

Technical Editors

Ami Latker Tim Stebbins

Production Editors

Nick Haring Andy Davenport Eliza Moore Ami Latker

GIS Graphics

Maiko Kaysua Dawn Olson

Executive Summary

Ami Latker Tim Stebbins

Chapter 1. General Introduction

Tim Stebbins

Chapter 2. Oceanographic Conditions

Dan Ituarte Ami Latker

Chapter 3. Microbiology

Andrew Davenport Ami Latker

Chapter 4. Sediment Characteristics

Eliza Moore Ami Latker

Chapter 5. Macrobenthic Communities

Nick Haring Tim Stebbins

Chapter 6. Demersal Fishes & Megabenthic Invertebrates

Robin Gartman Ami Latker

Chapter 7. Bioaccumulation of Contaminants in Fish Tissues

Ami Latker

Cover Photos (clockwise from top left): *Mediaster aequalis*, *Spatangus californicus*, flag rockfish (*Sebastodes rubrivinctus*), *Astropecten ornatissimus*, *Glyptolithodes cristatipes*, *Pisaster giganteus capitatus*, *Randalia ornata*, Speckled sanddabs (*Citharichthys stigmaeus*), *Crossata californica* (center image). Photos by Nick Haring.

CITY OF SAN DIEGO OCEAN MONITORING PROGRAM

Alan Langworthy
Deputy Metropolitan Wastewater Director
Environmental Monitoring and Technical Services Division

Marine Biology & Ocean Operations

Tim Stebbins
Senior Marine Biologist

John Byrne	Geoff Daly	Andrew Davenport
Timothy Douglass	Ross Duggan	Adriano Feit
Robin Gartman	Nick Haring	Daniel Ituarte
Michael Kelly	Maiko Kasuya	Kathy Langan-Cranford
Ami Latker	Megan Lilly	Nester Malibago
Richard Mange	Ricardo Martinez-Lara	Eliza Moore
Dawn Olson	Veronica Rodriguez-Villanueva	Kathleen Snow
Wendy Storms	Ron Velarde	Lan Wiborg

Marine Microbiology / Vector Management

George Alfonso	Roxanne Davis	André Macedo
Laila Othman	Zaira Rodriguez	Sonji Romero
Aaron Russell	Rumana Shahzad	Joseph Toctocan
Zakee Shabazz		

Acknowledgments: We are grateful to the personnel of the City's Marine Biology Laboratory for their assistance in the collection and processing of all samples and for discussions of the results. The completion of this report would not have been possible without their continued efforts and contributions. We would also like to acknowledge the City's Microbiology and Wastewater Chemistry laboratories for providing the bacteriological and chemistry data analyzed herein.